

```
0!( DOIT AND STACK FRAME VERBS )
1!( CODE VERB TO INDIRECTLY CALL VERB WHOSE ADDR IS ON STACK )
2!CODE DOIT H POP, PCHL, NEXT
3!
4!# P@ PARAM @ ;
5!# >P PARAM ;
6!# P! PARAM ! ;
7!# P@+ PARAM @ + ;
8!# P@+@ P@+ @ ;
9!# P@+! P@+ ! ;
10!-->
11!
12!
13!
14!
15!
```

OK  
 .NLIST  
 ( TERSE TEMPORARY ARGS )  
 ( ERROR CATCHERS )

SUBR OVERB

809A C9 RET,

SUBR UNDER

80A8 C9 RET,

SUBR DIVO

80B5 C9 RET,

SUBR MERR

80C2 C9 RET, ( UTILITY SUBROUTINES )

SUBR zero

80CF DD 36 0 0 0 0 X MVIX,

80D3 DD 36 1 0 0 1 X MVIX,

80D7 DD 36 2 0 0 2 X MVIX,

80DB DD 36 3 0 0 3 X MVIX,

80DF C9 RET,

SUBR ST01

8126 11 14 E1 0 TEMP1 D LXI,

8129 C3 35 81 STO JMP,

LABEL ST02

812C 11 18 E1 0 TEMP2 D LXI,

812F C3 35 81 STO JMP,

LABEL ST03

8132 11 1C E1 0 TEMP3 D LXI,

LABEL STO

8135 DD E5 X PUSHX,

8137 E1 H POP,

LABEL MOVER

8138 1 4 0 4 B LXI,

813B ED B0 LDIR,

813D C9 RET,

LABEL LD

813E DD E5 X PUSHX,

8140 D1 D POP,

8141 18 F5 MOVER JMPR, ( FROUND )

SUBR FROUND

815D D9 <ASSEMBLE EXX,

815E 19 D DAD,

815F D9 EXX,

8160 11 0 0 0 D LXI,

8163 ED 5A D DADC,

8165 30 4 FSTO JRNC,

8167 C C INR,

8168 CA 9A 80 OVERB JZ,

LABEL FSTO

816B DD 71 3 C 3 X STX,

816E 7C H A MOV,

816F E6 7F 7F ANI,

8171 B0 B ORA,

8172 DD 77 0 A 0 X STX,

8175 DD 75 1 L 1 X STX,

8178 D9 EXX,

8179 DD 74 2 H 2 X STX,

817C C9 RET, ( FLOATING POINT ALIGN ROUTINE )

SUBR ALIGN

8184 7D

8197	2E 0	O L MVI,	
8199	D9	EXX,	
819A	4F	A C MOV,	
819B	D9	EXX,	
819C	93	E SUB,	
819D	5D	L E MOV,	
819E	C8	RZ,	
819F	6 19	DECIMAL 25 HEX B MVI,	
LABEL AL10			
81A1	D9	EXX,	
81A2	CB 3A	D SRLR,	
81A4	CB 1B	E RARR,	
81A6	D9	EXX,	
81A7	CB 1A	D RARR,	
81A9	CB 1B	E RARR,	
81AB	3D	A DCR,	
81AC	C8	RZ,	
81AD	10 F2	AL10 DJNZ,	
81AF	C9	RET,	( FLOATING ADD AND SUBTRACT ROUTINE
SUBR SUB			
8226	FD 7E 0	O Y A LDX,	
8229	EE 80	80 XRI,	
822B	57	A D MOV,	
822C	DD 66 0	O X H LDX,	
822F	C3 38 82	AD05 JMP,	
LABEL ADD			
8232	DD 66 0	O X H LDX,	
8235	FD 56 0	O Y D LDX,	
LABEL AD05			
8238	AF	A XRA,	
8239	DD BE 3	3 X CMPX,	
823C	C2 4E 82	AD06 JNZ,	
823F	FD BE 3	3 Y CMPX,	
8242	C8	RZ,	
8243	7A	D A MOV,	
8244	FD E5	Y PUSHX,	
8246	E1	H POP,	
8247	CD 3E 81	LD CALL,	
824A	DD 77 0	A O X STX,	
824D	C9	RET,	
LABEL AD06			
824E	DD 74 0	H O X STX,	
8251	FD BE 3	3 Y CMPX,	
8254	C8	RZ,	
LABEL AD07			
8255	7C	H A MOV,	
8256	E6 80	80 ANI,	
8258	47	A B MOV,	
8259	CB FC	7 H SET,	
825B	7A	D A MOV,	
825C	E6 80	80 ANI,	
825E	4F	A C MOV,	
825F	CB FA	7 D SET,	
8261	A8	B XRA,	
8262	8	EXAF,	
8263	DD 6E 1	1 X L LDX,	
8266	FD 5E 1	1 Y E LDX,	
8269	D9	EXX,	
826A	DD 66 2	2 X H LDX,	
826D	FD 56 2	2 Y D LDX,	
8270	DD 6E 3	3 X L LDX,	
8273	FD 5E 3	3 Y E LDX,	
LABEL AD10			
8276	7D	L A MOV,	
8277	8D	E CMP,	

```

8277  EB      E CHG,
8278  30  5      AD20 JRNC,
827A  EB      XCHG,
827B  D9      EXX,
827C  EB      XCHG,
827D  41      C B MOV,
827E  D9      EXX, ( ADD, SUBTRACT CONTINUED )

```

```

      LABEL AD20
827F  CD 96 81      ALIGN CALL,
8282  8      EXAF,
8283  FA A1 82      SB20 JM,
8286  19      D DAD,
8287  11 80  0      80 D LXI,
828A  D9      EXX,
828B  ED 5A      D DADC,
828D  D2 5D 81      FROUND JNC,
8290  C      C INR,
8291  CA 9A 80      OVERB JZ,
8294  CB 1C      H RARR,
8296  CB 1D      L RARR,
8298  D9      EXX,
8299  CB 1C      H RARR,
829B  CB 1D      L RARR,
829D  D9      EXX,
829E  C3 5D 81      FROUND JMP,

```

```

      LABEL SB20
82A1  A7      A ANA,
82A2  ED 52      D DSBC,
82A4  11 80  0      80 D LXI,
82A7  D9      EXX,
82A8  ED 52      D DSBC,
82AA  D2 C3 82      SB30 JNC,
82AD  3E 80      80 A MVI,
82AF  A8      B XRA,
82B0  47      A B MOV,
82B1  D9      EXX,
82B2  EB      XCHG,
82B3  21  0  0      0 H LXI,
82B6  A7      A ANA,
82B7  ED 52      D DSBC,
82B9  11 80  0      80 D LXI,
82BC  D9      EXX,
82BD  EB      XCHG,
82BE  21  0  0      0 H LXI,
82C1  ED 52      D DSBC,

```

```

      LABEL SB30
82C3  FA 5D 81      FROUND JM,
82C6  D9      EXX,
82C7  6 18      DECIMAL 24 HEX B MVI,

```

```

      LABEL SB40
82C9  29      H DAD,
82CA  D9      EXX,
82CB  D      C DCR,
82CC  CA A8 80      UNDER JZ,
82CF  ED 6A      H DADC,
82D1  FA 5D 81      FROUND JM,
82D4  D9      EXX,
82D5  10 F2      SB40 DJNZ,
82D7  C3 CF 80      zero JMP, ( FLOAT ROUTINE )

```

```

SUBR float
8319  DD 6E  0      0 X L LDX,
831C  DD 66  1      1 X H LDX,

```

```

      LABEL FLOAT1
831F  7C      H A MOV,
8320  B5      L ORA,

```

8321	CA	00	80	zero JZ,	
8324	7C			H A MOV,	
8325	E6	80		80 ANI,	
8327	28	6		FL10 JRZ,	
8329	EB			XCHG,	
832A	21	0	0	0 H LXI,	
832D	ED	52		D DSBC,	
LABEL FL10					
832F	E	90		90 C MVI,	
8331	FA	3B	83	FL30 JM,	
8334	A7			A ANA,	
LABEL FL20					
8335	D			C DCR,	
8336	ED	6A		H DADC,	
8338	F2	35	83	FL20 JP,	
LABEL FL30					
833B	CB	BC		7 H RES,	
833D	B4			H ORA,	
833E	DD	77	0	A 0 X STX,	
8341	DD	75	1	L 1 X STX,	
8344	DD	36	2 0	0 2 X MVIX,	
8348	DD	71	3	C 3 X STX,	
834B	C9			RET,	( FIX ROUTINE )
SUBR fix					
83B7	FD	21	7B 80	C.5 Y LXIX,	
83B8	CD	32	82	ADD CALL,	
83BE	CD	D9	83	FIXA CALL,	
83C1	30	F		FX60 JRNC,	
83C3	21	20	E1	ERROR H LXI,	
83C6	CB	F6		6 M SET,	
83C8	21	FF	7F	7FFF H LXI,	
83CB	DD	CB	0 7E	7 0 X BITX,	
83CF	28	1		FX60 JRZ,	
83D1	23			H INX,	
LABEL FX60					
83D2	DD	75	0	L 0 X STX,	
83D5	DD	74	1	H 1 X STX,	
83D8	C9			RET,	
LABEL FIXA					
83D9	AF			A XRA,	
83DA	67			A H MOV,	
83DB	6F			A L MOV,	
83DC	DD	BE	3	3 X CMPX,	
83DF	CB			RZ,	
83E0	DD	66	0	0 X H LDX,	
83E3	CB	FC		7 H SET,	
83E5	DD	6E	1	1 X L LDX,	
83E8	3E	90		90 A MVI,	
83EA	DD	96	3	3 X SUBX,	
83ED	D8			RC,	
83EE	28	13		FX25 JRZ,	
83F0	6	10		DECIMAL 16 HEX B MVI,	
83F2	B8			B CMP,	
83F3	30	1		FX10 JRNC,	
83F5	47			A B MOV,	
LABEL FX10					
83F6	AF			A XRA,	
83F7	DD	BE	2	2 X CMPX,	
83FA	17			RAL,	( FIX CONTINUED )
LABEL FX20					
83FB	CB	3C		H SRLR,	
83FD	CB	1D		L RARR,	
83FF	CE	0		0 ACI,	
8401	10	F8		FX20 DJNZ,	
LABEL FX25					
8403	DD	CB	0 7E	7 0 X BITX,	

8407	28 10	FX40 JRZ,	
8409	A7	A ANA,	
840A	28 1	FX30 JRZ,	
840C	23	H INX,	
LABEL FX30			
840D	EB	XCHG,	
840E	21 0 0	0 H LXI,	
8411	A7	A ANA,	
8412	ED 52	D DSBC,	
8414	F2 1D 84	FX50 JP,	
8417	A7	A ANA,	
8418	C9	RET,	
LABEL FX40			
8419	A7	A ANA,	
841A	CB 7C	7 H BIT,	
841C	C8	RZ,	
LABEL FX50			
841D	37	STC,	
841E	C9	RET,	( ROUTINE TO PUSH AND POP TERSE TEMP
SUBR POPTT1			
842D	E1	H POP,	
842E	D1	D POP,	
842F	ED 53 C E1	0 TT1 SDED,	
8433	D1	D POP,	
8434	ED 53 E E1	2 TT1 SDED,	
8438	E9	PCHL,	
SUBR POPTT2			
8447	E1	H POP,	
8448	D1	D POP,	
8449	ED 53 10 E1	0 TT2 SDED,	
844D	D1	D POP,	
844E	ED 53 12 E1	2 TT2 SDED,	
8452	E9	PCHL,	
SUBR POPT16			
8461	E1	H POP,	
8462	D1	D POP,	
8463	ED 53 C E1	0 TT1 SDED,	
8467	E9	PCHL,	
SUBR PUSHTT1			
8477	E1	H POP,	
8478	ED 5B E E1	2 TT1 LDED,	
847C	D5	D PUSH,	
847D	ED 5B C E1	0 TT1 LDED,	
8481	D5	D PUSH,	
8482	E9	PCHL,	
SUBR PUSHTT2			
8492	E1	H POP,	
8493	ED 5B 12 E1	2 TT2 LDED,	
8497	D5	D PUSH,	
8498	ED 5B C E1	0 TT1 LDED,	
849C	D5	D PUSH,	
849D	E9	PCHL,	
SUBR PUSHT16			
84AD	E1	H POP,	
84AE	ED 5B C E1	0 TT1 LDED,	
84B2	D5	D PUSH,	
84B3	E9	PCHL,	
SUBR SAVER			
84C1	E1	H POP,	

```

84C1 E1 H POP,
84C2 C5 B PUSH,
84C3 DD E5 X PUSHX,
84C5 FD E5 Y PUSHX,
84C7 DD 21 C E1 O TT1 X LXIX,
84CB FD 21 10 E1 O TT2 Y LXIX,
84CF E9 PCHL,

```

#### SUBR RESTORER

```

84E0 E1 H POP,
84E1 FD E1 Y POPX,
84E3 DD E1 X POPX,
84E5 C1 B POP,
84E6 E9 PCHL, ( MULTIPLY UTILITIES )

```

#### SUBR RSTO

```

8500 11 0 0 O D LXI,
8503 ED 5A D DADC,
8505 CE 0 O ACI,
8507 30 1 RSTOA JRNC,
8509 4 B INR,

```

#### LABEL RSTOA

```

850A DD 74 1 H 1 X STX,
850D DD 75 2 L 2 X STX,
8510 E6 7F 7F ANI,
8512 67 A H MOV,
8513 8 EXAF,
8514 B4 H ORA,
8515 DD 77 0 A 0 X STX,
8518 FD 7E 3 3 Y A LDX,
851B E6 80 80 ANI,
851D 4F A L MOV,
851E DD 7E 3 3 X A LDX,
8521 D6 80 80 SUI,
8523 C9 RET,

```

#### SUBR LOADY

```

8531 FD 4E 0 O Y C LDX,
8534 FD 56 1 1 Y D LDX,
8537 FD 5E 2 2 Y E LDX,
853A A9 C XRA,
853B E6 80 80 ANI,
853D CB F9 7 C SET,
853F C9 RET, ( MULTIPLY ROUTINE )

```

#### SUBR MULT

```

85AD AF CASSEMBLE A XRA,
85AE DD BE 3 3 X CMPX,
85B1 CA CF 80 zero JZ,
85B4 FD BE 3 3 Y CMPX,
85B7 CA CF 80 zero JZ,
85BA DD 66 0 O X H LDX,
85BD DD 6E 1 1 X L LDX,
85C0 DD 56 2 2 X D LDX,
85C3 7C H A MOV,
85C4 CB FC 7 H SET,
85C6 D9 EXX,
85C7 CD 31 85 LOADY CALL,
85CA 8 EXAF,
85CB AF A XRA,
85CC 67 A H MOV,
85CD 6F A L MOV,
85CE 6 18 DECIMAL 24 B HEX MVI,
85D0 18 5 ML1 JMPR,

```

#### LABEL MLOOP

```

85D2 1F RAR,
85D3 CB 1C H PASS,

```

*D6*  
*sub*

```

85D5 CB 1D L RARR,
      LABEL ML1
85D7 D9 EXX,
85D8 CB 1C H RARR,
85DA CB 1D L RARR,
85DC CB 1A D RARR,
85DE D9 EXX,
85DF 30 2 ML2 JRNCL
85E1 19 D DAD,
85E2 89 C ADC,
      LABEL ML2
85E3 10 ED MLOOP DJNZ,
85E5 D2 F0 85 MROUND JNC,
85E8 1F RAR,
85E9 CB 1C H RARR,
85EB CB 1D L RARR,
85ED C3 F5 85 MROUND1 JMP,
      LABEL MROUND
85F0 D9 EXX,
85F1 CB 14 H RARR,
85F3 D9 EXX,
85F4 5 B DCR,
      LABEL MROUND1
85F5 CD 0 85 RSTO CALL,
85F8 81 C ADD, ( MULTIPLY CONTINUED )
      LABEL MCHK
85F9 EA 3 86 M10 JPE,
85FC 80 B ADD,
85FD EA C2 80 MERR JPE,
8600 C3 7 86 M20 JMP,
      LABEL M10
8603 80 B ADD,
8604 E2 C2 80 MERR JPO,
      LABEL M20
8607 C6 80 80 ADI,
8609 CA A8 80 UNDER JZ,
860C DD 77 3 A 3 X STX,
860F C9 RET, ( DIVIDE ROUTINE )

SUBR DIVI
866D AF CASSEMBLE A XRA,
866E FD BE 3 3 Y CMPX,
8671 CA B5 80 DIVO JZ,
8674 DD BE 3 3 X CMPX,
8677 CA CF 80 zero JZ,
867A DD 46 0 0 X B LDX,
867D DD 66 1 1 X H LDX,
8680 DD 45 2 2 X L LDX,
8683 CD 31 85 LOADY CALL,
8686 8 EXAF,
8687 78 B A MOV,
8688 F6 80 80 ORI,
868A 6 1A DECIMAL 26 HEX B MVI,
868C C3 A3 86 DVSUB JMP,
      LABEL DVOV
868F A7 A ANA,
8690 ED 52 D DSBC,
8692 99 C SBB,
      LABEL DVRES1
8693 37 STC,
8694 5 B DCR,
8695 28 16 DVNORM JRZ,
      LABEL DVLOOP
8697 D9 EXX,
8698 ED 6A H DADC,
8699 CB 1C F DAD,

```

78  
B A MOV,



```

869A 0B 13      E RALR,
869C CB 12      D RALR,
869E D9         EXX,
869F 29         >H DAD,
86A0 8F         A ADC,
86A1 38 EC      DVOV JRC,
      LABEL DVSUB
86A3 ED 52      D DSBC,
86A5 99         C SBB,
86A6 30 EB      DVRES1 JRNCR,
86A8 19         D DAD,
86A9 89         C ADC,
86AA A7         A ANA,
86AB 10 EA      DVLOOP DJNZ, ( MORE DIVIDE )
      LABEL DVNORM
86AD D9         EXX,
86AE 6 0        O B MVI,
86B0 7B         E A MOV,
86B1 CB 42      O D BIT,
86B3 28 7       DROUND JRZ,
86B5 4          B INR,
86B6 37         STC,
86B7 1F         RAR,
86B8 CB 1C      H RARR,
86BA CB 1D      L RARR,
      LABEL DROUND
86BC CD 0 85    RSTO CALL,
86BF 91         C SUB,
86C0 C3 F9 85   MCHK JMP, ( SQUARE ROOT ROUTINE )

SUBR SQR
86E7 DD 7E 3    <ASSEMBLE 3 X A LDX,
86EA B7         A ORA,
86EB CA CF 80   zero JZ,
86EE DD CB 0 7E 7 O X BITX,
86F2 C4 34 87   SQERR CNZ,
86F5 D6 80      80 SUI,
86F7 47         A B MOV,
86F8 CB 2F      A SRAR,
86FA CE 0       O ACI,
86FC F5         PSW PUSH,
86FD 87         A ADD,
86FE 90         B SUB,
86FF ED 44      NEG,
8701 C6 80      80 ADI,
8703 3D         A DCR,
8704 DD 77 3    A 3 X STX,
8707 CD 26 81   STO1 CALL,
870A FD 21 6C 80 PSQ00 Y LXIX,
870E CD 32 82   ADD CALL,
8711 6 3        3 B MVI,
      LABEL SQ10
8713 C5         B PUSH,
8714 CD 2C 81   STO2 CALL,
8717 21 14 E1   O TEMP1 H LXI,
871A CD 3E 81   LD CALL,
871D FD 21 18 E1 O TEMP2 Y LXIX,
8721 CD 6D 86   DIVI CALL,
8724 FD 35 3    3 Y DCRX,
8727 CD 32 82   ADD CALL,
872A C1         B POP,
872B 10 E6      SQ10 DJNZ,
872D F1         PSW POP,
872E C6 80      80 ADI,
8730 DD 77 3    A 3 X STX,
8733 C9         RET,
      LABEL SCRR

```

8734	21 20 E1	ERROR H LXI,	
8737	CB DE	3 M SET,	
8739	DD CB 0 BE	7 0 X RESX,	
873D	C9	RET,	( LINKS TO TERSE FLOATING POINT CRUD

CODE FLOAT			
8746	CD 61 84	POPT16 CALL,	
8749	CD C1 84	SAVER CALL,	
874C	CD 19 83	float CALL,	
874F	CD E0 84	RESTORER CALL,	
8752	CD 77 84	PUSHTT1 CALL,	
8755	FD E9	NEXT	

CODE FIX			
875D	CD 2D 84	POPTT1 CALL,	
8760	CD C1 84	SAVER CALL,	
8763	CD B7 83	fix CALL,	
8766	CD E0 84	RESTORER CALL,	
8769	CD AD 84	PUSHT16 CALL,	
876C	FD E9	NEXT	

CODE F+			
8773	CD 2D 84	POPTT1 CALL,	
8776	CD 47 84	POPTT2 CALL,	
8779	CD C1 84	SAVER CALL,	
877C	CD 32 82	ADD CALL,	
877F	CD E0 84	RESTORER CALL,	
8782	CD 77 84	PUSHTT1 CALL,	
8785	FD E9	NEXT	

CODE F-			
878C	CD 2D 84	POPTT1 CALL,	
878F	CD 47 84	POPTT2 CALL,	
8792	CD C1 84	SAVER CALL,	
8795	CD 26 82	SUB CALL,	
8798	CD E0 84	RESTORER CALL,	
879B	CD 77 84	PUSHTT1 CALL,	
879E	FD E9	NEXT	

$$\begin{array}{cccc} 4 & 3 & 1 & 2 \\ X1 & X2 & | & (Y1 - Y2) * 2 \\ & & | & \\ & & | & \end{array}$$

$$\begin{array}{ccc} 4 & 32 & 1 \\ X1 & \text{nw} & X2 \end{array}$$

$X1 \quad X2 \quad Y1 \quad X2$

$Y1 \quad Y2$

$X1 \quad Y1 \quad X2 \quad Y2$

$$\begin{array}{ccccccc} 5 & 4 & 3 & 2 & 1 \\ X1 & , & yf & , & yf & , & xf & , & xf \end{array}$$

OK  
 .NLIST  
 ( ERROR CATCHERS )

SUBR OVERB

8075 C9 RET,

SUBR UNDER

8083 C9 RET,

SUBR DIVO

8090 C9 RET, ( UTILITY SUBROUTINES )

SUBR zero

809D DD 36 0 0 0 0 X MVIX,  
 80A1 DD 36 1 0 0 1 X MVIX,  
 80A5 DD 36 2 0 0 2 X MVIX,  
 80A9 DD 36 3 0 0 3 X MVIX,  
 80AD C9 RET,

SUBR STO1

80F4 11 C E1 0 TEMP1 D LXI,  
 80F7 C3 3 81 STO JMP,

LABEL STO2

80FA 11 14 E1 0 TEMP2 D LXI,  
 80FD C3 3 81 STO JMP,

LABEL STO3

8100 11 1C E1 0 TEMP3 D LXI,

LABEL STO

8103 DD E5 X PUSHX,  
 8105 E1 H POP,

LABEL MOVER

8106 1 4 0 4 B LXI,  
 8109 ED B0 LDIR,  
 810B C9 RET,

LABEL LD

810C DD E5 X PUSHX,  
 810E D1 D POP,  
 810F 18 F5 MOVER JMPR, ( FROUND )

SUBR FROUND

812B D9 CASSEMBLE EXX,  
 812C 19 D DAD,  
 812D D9 EXX,  
 812E 11 0 0 0 D LXI,  
 8131 ED 5A D DADC,  
 8133 30 4 FSTO JRNC,  
 8135 C C INR,  
 8136 CA 75 80 OVERB JZ,

LABEL FSTO

8139 DD 4E 3 ~~8139 DD 4E 3~~ ← C 3 X STX —  
 813C 7C H A MOV,  
 813D E6 7F 7F ANI,  
 813F B0 B ORA,  
 8140 DD 77 0 A 0 X STX,  
 8143 DD 75 1 L 1 X STX,  
 8146 D9 EXX,  
 8147 DD 74 2 H 2 X STX,  
 814A C9 RET, ( FLOATING POINT ALIGN ROUTINE )

SUBR ALIGN

8164 7D L A MOV,  
 8165 2E 0 0 L MVI,  
 8167 D9 EXX,  
 8168 4F A C MOV,  
 8169 D9 EXX,

816A 93 E SUB,  
 816B 5D L E MOV,  
 816C C8 RZ,  
 816D 6 19 DECIMAL 25 HEX B MVI,

LABEL AL10

816F D9 EXX,  
 8170 CB 3A D SRLR,  
 8172 CB 1B E RARR,  
 8174 D9 EXX,  
 8175 CB 1A D RARR,  
 8177 CB 1B E RARR,  
 8179 3D A DCR,  
 817A C8 RZ,  
 817B 10 F2 AL10 DJNZ,  
 817D C9 RET,

( FLOATING ADD AND SUBTRACT ROUTINE

SUBR SUB

81F4 FD 7E 0  
 81F7 EE 80  
 81F9 57  
 81FA DD 7E 0  
 81FD C3 6 82

0 Y A LDX,  
 80 XRI,  
 A D MOV,  
 0 X H LDX,  
 AD05 JMP,

LABEL ADD

8200 DD 66 0  
 8203 DD 56 0

0 X H LDX,  
 0 X D LDX,

LABEL AD05

8206 AF  
 8207 DD BE 3  
 820A C2 1C 82  
 820D FD BE 3  
 8210 C8  
 8211 7A  
 8212 FD E5  
 8214 E1  
 8215 CD C 81  
 8218 DD 77 0  
 821B C9

A XRA,  
 3 X CMPX,  
 AD06 JNZ,  
 3 Y CMPX,  
 RZ,  
 D A MOV,  
 Y PUSHX,  
 H POP,  
 LD CALL,  
 A 0 X STX,  
 RET,

LABEL AD06

821C DD 74 0  
 821F FD BE 3  
 8222 C8

H 0 X STX,  
 3 Y CMPX,  
 RZ,

LABEL AD07

8223 7C  
 8224 E6 80  
 8226 47  
 8227 CB FC  
 8229 7A  
 822A E6 80  
 822C 4F  
 822D CB FA  
 822F A8  
 8230 8  
 8231 DD 6E 1  
 8234 FD 5E 1  
 8237 D9  
 8238 DD 66 2  
 823B FD 56 2  
 823E DD 6E 3  
 8241 FD 5E 3

H A MOV,  
 80 ANI,  
 A B MOV,  
 7 H SET,  
 D A MOV,  
 80 ANI,  
 A C MOV,  
 7 D SET,  
 B XRA,  
 EXAF,  
 1 X L LDX,  
 1 Y E LDX,  
 EXX,  
 2 X H LDX,  
 2 Y D LDX,  
 3 X L LDX,  
 3 Y E LDX,

LABEL AD10

8244 7D  
 8245 BB  
 8246 30 5  
 8248 EB  
 8249 D9  
 824A EB

L A MOV,  
 E CMP,  
 AD20 JRNC,  
 XCHG,  
 EXX,  
 XCHG,

0 X H LDX-  
 0 Y D LDX

```

824A  EB          XCHG,
824B  41          C B MOV,
824C  D9          EXX, ( ADD, SUBTRACT CONTINUED )

```

```

      LABEL AD20
824D  CD 64 81    ALIGN CALL,
8250      8        EXAF,
8251  FA 6F 82    SB20 JM,
8254  19          D DAD,
8255  11 80 0     80 D LXI,
8258  D9          EXX,
8259  ED 5A       D DADC,
825B  D2 2B 81    FROUND JNC,
825E  C           C INR,
825F  CA 75 80    OVERB JZ,
8262  CB 1C       H RARR,
8264  CB 1D       L RARR,
8266  D9          EXX,
8267  CB 1C       H RARR,
8269  CB 1D       L RARR,
826B  D9          EXX,
826C  C3 2B 81    FROUND JMP,

```

```

      LABEL SB20
826F  A7          A ANA,
8270  ED 52       D DSBC,
8272  11 80 0     80 D LXI,
8275  D9          EXX,
8276  ED 52       D DSBC,
8278  D2 91 82    SB30 JNC,
827B  3E 80       80 A MVI,
827D  A8          B XRA,
827E  47          A B MOV,
827F  D9          EXX,
8280  EB          XCHG,
8281  21 0 0      0 H LXI,
8284  A7          A ANA,
8285  ED 52       D DSBC,
8287  11 80 0     80 D LXI,
828A  D9          EXX,
828B  EB          XCHG,
828C  21 0 0      0 H LXI,
828F  ED 52       D DSBC,

```

```

      LABEL SB30
8291  FA 2B 81    FROUND JM,
8294  D9          EXX,
8295  6 18        DECIMAL 24 HEX B MVI,

```

```

      LABEL SB40
8297  29          H DAD,
8298  D9          EXX,
8299  D           C DCR,
829A  CA 83 80    UNDER JZ,
829D  ED 6A       H DADC,
829F  FA 2B 81    FROUND JM,
82A2  D9          EXX,
82A3  10 F2       SB40 DJNZ,
82A5  C3 9D 80    zero JMP,

```

( FLOAT ROUTINE )

```

SUBR FLOAT
82E7  DD 6E 0     0 X L LDX,
82EA  DD 66 1     1 X H LDX,

```

```

      LABEL FLOAT1
82ED  7C          H A MOV,
82EE  B5          L ORA,
82EF  CA 9D 80    zero JZ,
82F2  7C          H A MOV,
82F3  E6 80       80 ANI,
82F5  28 6        FL10 JRZ,
82F7  EB          XCHG,

```

```

82F7  ED      ALRG,
82F8  21  0  0    0 H LXI,
82FB  ED 52      D DSBC,
      LABEL FL10
82FD  E 90      90 C MVI,
82FF  FA  9 83   FL30 JM,
8302  A7        A ANA,
      LABEL FL20
8303  D         C DCR,
8304  ED 6A      H DADC,
8306  F2  3 83   FL20 JP,
      LABEL FL30
8309  CB BC      7 H RES,
830B  B4         H ORA,
830C  DD 77  0   A 0 X STX,
830F  DD 75  1   L 1 X STX,
8312  DD 36  2  0 0 2 X MVIX,
8316  DD 71  3   C 3 X STX,
8319  C9        RET, ( FIX ROUTINE )

```

```

SUBR FIX
8385  FD 21 64 80 C.5 Y LXIX,
8389  CD  0 82    ADD CALL,
838C  CD A7 83    FIXA CALL,
838F  30  F      FX60 JRNC,
8391  21 24 E1    ERROR H LXI,
8394  CB F6      6 M SET,
8396  21 FF 7F    7FFF H LXI,
8399  DD CB  0 7E 7 0 X BITX,
839D  28  1      FX60 JRZ,
839F  23         H INX,

```

```

      LABEL FX60
83A0  DD 75  0   L 0 X STX,
83A3  DD 74  1   H 1 X STX,
83A6  C9        RET,

```

```

      LABEL FIXA
83A7  AF        A XRA,
83A8  67        A H MOV,
83A9  6F        A L MOV,
83AA  DD BE  3   3 X CMPX,
83AD  C8        RZ,
83AE  DD 66  0   0 X H LDX,
83B1  CB FC      7 H SET,
83B3  DD 6E  1   1 X L LDX,
83B6  3E 90      90 A MVI,
83B8  DD 96  3   3 X SUBX,
83BB  D8        RC,
83BC  28 13      FX25 JRZ,
83BE  6 10      DECIMAL 16 HEX B MVI,
83C0  B8        B CMP,
83C1  30  1      FX10 JRNC,
83C3  47        A B MOV,

```

```

      LABEL FX10
83C4  AF        A XRA,
83C5  DD BE  2   2 X CMPX,
83C8  17        RAL, ( FIX CONTINUED )

```

```

      LABEL FX20
83C9  CB 3C      H SRLR,
83CB  CB 1D      L RARR,
83CD  CE  0      0 ACI,
83CF  10 F8      FX20 DJNZ,

```

```

      LABEL FX25
83D1  DD CB  7 46 0 X 7 BITX,
83D5  28 10      FX40 JRZ,
83D7  A7        A ANA,
83D8  28  1      FX30 JRZ,

```

7 0 X BITX?  
DDCB007E

83DB EB XCHG,  
83DC 21 0 0 0 H LXI,  
83DF A7 A ANA,  
83E0 ED 52 D DSBC,  
83E2 F2 EB 83 FX50 JF,  
83E5 A7 A ANA,  
83E6 C9 RET,

LABEL FX40  
83E7 A7 A ANA,  
83E8 CB FC 7 H SET,  
83EA C8 RZ,

LABEL FX50  
83EB 37 STC,  
83EC C9 RET, OK  
OK  
.NLIST

*CB,7C*  
~~BIT,~~ ←